San Antonio Radio Club

BULL-ETIN

President - Bill Way WA5QHG
Vice Pres. - Joe Gallagher WA5OMB
Secretary - Larry Scott WB5GVD
Treasurer - Frank Box WA5VFM
Sgt-at-Arms - Michael Rittimann WN5GAI

Meets first and third Fridays at 7:30 P.M. at the Red Cross Building, 90 Brees St. ALL who have an interest in amateur radio are cordially invited to attend.

Bull-etin Editor, Dean Davis W5BGE Asst. Ed., Maybelle Davis, XYL
Circulation Mgr., Bob Via WB5FDT

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By The WAY

By WA5QHG Bill Way

According to Joe WA5OMB, Club meeting Friday 17 May will be HOMEBREW NIGHT. Bring your projectd and show them off! Joe has been responsible for 3 recent excellent programs...so don't miss this one!

Frank Gerwitz W5QMH, our FD Chairman, is working hard to make our Field Day exercise a good one. The SARO group has been invited to join in the operation. A Swapfest is also planned to be held in conjunction with the FD exercise.

Field Day is 22-23 June at Northeast Preserve, on Jones-Maltzburger Rd--just north of Blossom Stadium. Frank is looking for H-E-L-P! All interested amateurs in the SA area are invited to participate in this chance to utilize amateur equipment under emergency conditions for a continuous 24 hours. FD will begin at 1800 Z (1 p.m. CDST) Saturday 22 June. Beer and soft drinks will be furnished by the Club. Emergency power will be available. Frank said that plans to operate on as many bands as there is interest are under way, especially the Novice Band.

FIELD DAY

NEW RULE: If one or more contacts are made using equipment that is totally powered by a source of energy that is derived from "natural" power, such as wind, solar or water power the FD group will get a 100 point bonus. Oil, coal, natural gas, nuclear fuels or any other fossil fuels or their derivatives are not allowed. The energy source must be described. Commercial electric mains or batteries may not be used for this bonus. Frank is frantically looking sor someone with an idea how this can be done! Cum-on Cal Graf, Clay Laster, George Munsch, John Bruemmer, Gene Jank, etc., Start Thinking!

Another new rule is that once you go to a band you must stay there at least 15 minutes. After the initial 15 min. period is over you can change bands whenever you wish.

Each phone and each CW segment is considered as a separate band. A station may be worked once on each band. Cross-band contacts are not allowed. The use of more than one transmitter at the same time in a single band is prohibited, except that a novice position may operate on any novice band segment at any time. Stations making contact, in order to count their contact as valid, must exchange ARRL section (see page 6 in any QST) and signal report. See May QST, page 68 for complete ARRL Field Day Rules. We need YOU, you need Field Day. Get behind Frank.

73, Bill Way WA5QHG.

Technical Topics

By W5LFM Cal Graf

The 19 April 74 meeting of the SARC was held at San Antonio College where Floyd Roland W5JKU and Bill Way WA5QHG showed off their electronic wares in the Electronics Department. The teaching and demonstration aids available to the teacher and student today are really amazing. Years ago the oscilloscope was a precision tool available to advanced shops only while today it serves a number of different purposes such as a comupter CRT input device. The SARC students must really come out with some smarts as the level of teaching must be about 20 years ahead of what it used to be. IC chips (or bugs, which used to be a VW but is now a beetle) are as plentiful as carbon resistors used to be in most schools. I remember when Floyd and I were attending UT at Austin 20 years ago. When you checked out a rheostat from the Physics Department lab (one could get electronics courses only in Physics then) you got an 1890 version which weighed at least 20 lbs. As the cigarette ad says, "You've come a long way, baby."

The landslide sale of pocket electronic calculators continues unabated. According to Electronic News, sales in 1973 totaled 8 to 10 million. That number is expected to double in 1974. And National's six-digit NS 600 4-functional calculator has dropped its price to $24.95 from $39.50 which it was in Sept '73. Hewlett Packard just announced today that it had dropped its price on the HP-45 $70 so that it now costs only $325. Better hurry and get yours!

From time to time we've talked about the Dick Tracy wrist TV and wondered just how it might be possible to make such a small thing. Well, RCA is getting close to doing something about it and they have a receiver on a chip. RCA now offers an IC radio receiver subsystem on a single 14-pin plastic DIP. The CA3123E provides an RF amplifier, IF amplifier, mixer, oscillator, AGC detector, and voltage regulator on a single chip. It is intended to be used in superhets for AM car radio use. Price for 1000 units is $1.23 each. It won't be too long before complete transmitters will be available in IC chips with only the requirement to add a 9 volt transistor battery and antenna and you're on the air. A ham could have a complete TX and RX system on his person with the antenna run up his coat sleeve and down his pants leg. Tall fellows like Bill Way could operate on 80 meters and the short folks could have to stick to 10 meters when they operated "people mobile". But such is the way of the future from the way things are going.

A couple of interesting electronic components have recently come from the Matsushita Electric company of Tokyo. A humidity-sensitive switching element has been developed which will come out this summer. The element is comprised of electric inductive grains embedded in a high polymer compound coated over an insulator substrate such as glass, ceramic or plastic film. When the element compound absorbs moisture, it increases contact resistance between the electric conductive grains, thus resulting in a rapid increase in electrical resistance. Conventional humidity-sensitive switches such as human hair, nylon films and other moisture--absorbing substances respond only gradually to changes in humidity. The new element switches in about 10 seconds and switching levels can occur at any point over 50 per cent humidity. The new device will cost about $1.80 each. The device would be especially good for shutting down the rig in case a ham became too involved in a brow-sweating rag chew.

The second device coming from Tokyo is a negative resistance element which is a departure from the Esaki diode and thyrister. The element, which has a lambda-shaped voltage-current characteristic, shuts off an electric current when voltage exceeds a certain peak level, between 2.5 and 12 volts. The new element has applications in battery checkers in autos, TV sets and tape recorders, power stoppage indicators for watches, or electronic fuses to prevent overloads.

While liquid crystals were first used as displays in pocket calculators, their usefulness seems to be spreading. The liquid crystal thermometer has been appearing in the household area recently but has also found its way into the clinical office. The mercury-in-glass thermometer was invented by Gabriel Daniel Fahrenheit in 1714 and has not changed much in the past 250 years. Liquid crystals may change all that. An LC disposable oral clinical thermometer can measure body temperature to plus/minus 0.1 deg. F which is more accurate than the conventional thermo. Color changes from green to black on the device indicate the temperature recorded. These devices can also be used in electronic equipment to indicate hot spots which might

be the source of future equipment or component failure. One could truly keep an eye peeled for the hot spots at a ham convention. And remember, it is not true that the first liquid crystal was invented by Les Essington W5BE when he poured the coal to his 100 watt crystal-controlled oscillator. But so it goes.

Regards, Cal Graf W5LFM.

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S.A. Repeater Organization

By W5PKK Bob Wheaton

SARO ALIVE AND DOING WELL IN SAN ANTONIO

Contrary to information released by a nationally syndicated columnist recently, SARO is not dead ! No indeed. When the membership rolls were checked on April 6th, a total of 126 members were counted, up some 78% over the same period last year. If you're currently on VHF or UHF and not yet a member of the San Antonio Repeater Organization, rumor has it that Robert Osborn is the man to see about making a secret application, a large cash donation or whatever grabs your clandestime fancy. Please note the new number of our Customer Service/Complaints Department.....WED-9PM-34-94.

SARO PRESIDENT BOWS TO PRESSURE, RESIGNS! LEAVING TOWN ASAP

SARO President Harvey Dapeer K5DDJ and his family have decided to relocate to Houston, thus forcing his resignation as president. The reason cited was "too few beans on the table". We tried to get him to add more water to the beans, but Harvey is a long term planner and more practical than that. We're losing a good man. Under his leadership, a drastic reorientation of administrative policies and procedures was begun. We all wish him the best. Harvey will be suceeded as president by W. C. Spenn WA5QDV, who has served as VP since February. Few of us are uncertain about the direction the leadership will now take. W. C. is a good man too, somewhat automatically as he enjoys dual membership in SARO and SARC.

REPEATER LICENSES ARRIVE....WHEW! WR5ADH and WR5ADJ

After nearly a year of waiting for the FCC to act on the original applications, the SARO Executive Committee decided that favorable action would probably not be forthcoming. New applications were filed early this year and on April Fool's Day the licenses were received. Trustee is Neil Martin WA5FSR. Kudos to all who made this a reality, especially Gary Hendrickson W3DTN of FCC. Gary's suggestions and patience in helping us reapply were invaluable.

MAUDE INDICTED, CONVICTED, AND PUT TO REST--JUSTICE PREVAILS!

Maude (Intermaude) has finally been gagged after many months of her harassment. Before being put to rest she disputed the testimony of several eminent experts. Through the generosity of Rocky Rhodes W5MIF, SARO's Team of Prosecutors obtained the loan of several cavity resonators. These were installed on the repeaters' receivers. Maud vanished and has not been heard from since. From all indications SARO will soon be the proud owner of some shiny new cavities all our own. Laurels here go to the Engineering and Maintenance Committees and George W5VPQ without whose electronic magic machine the mathematics would still be scattered all over the floor. Work is still being done on the control system to guarantee compliance with FCC regs. Members interested in helping on this project should contact Homer K5MEN or Bill K5PWX. Please bring your own schematics.

73 & good deviating, Bob W5PKK.

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SPLATTER

The 7290 Tfc Net picnic at Lake Whitney 27-28 April was a success. Over 100 attended. SAers included: Roy W5EYB and Hazel, Lee K5HZR and Emma, Jerry W5KLV, Otto WA5UYE and Laura WN5FFP, Dean W5BGE and Maybelle. Otto won a Waters Nuverter for 6 & 2.....STEN convention will be 8 June at Pavillion #3 , Lady Bird Johnson Municipal Park At Fredericksburg, Texas, starting at 9:30 a.m. They will give a Tempo/One plus AC power supply. Donation tickets can be obtained from Jerry W5KLV.....Lynda Scott WB5LEN excited, along with ham husband Larry WB5GVD, over anticipated arrival of harmonic about August.....Both Canada and Honduras now have reciprocity of license.....According to ARRL Bulletin #477, the increase in licensing fee did not go into effect 1 May--will remain same until further notice.....The Texas Slow Speed CW Net has nowbeen in operation for a year. Tex. SS is a net which was founded with the purpose of training stations to handle tfc on CW--also a good chance to get your code speed back. 3748 Khz at 8 P.M. every day. de W5BGE Dean .

CLAY COMMENTS

FREQUENCY SHIFT KEYED TELETYPE DEMODULATOR DESIGN

By
W5ZPV
Clay Laster

The basic design for a simple, easy-to-adjust teletype (TTY) frequency shift keyed (FSD) demodulator has been completed and has been bench tested using off-the-air TTY signals received via the ham station's receiver. This FSK demod is capable of detecting frequency shifts as low as 170 HZ and as high as 1000 HZ. An LED (Light Emitting Diode) indicator arrangement, using two LED's in a positive-negative signal indicating circuit, provides an easy signal tuning arrangement.

The heart of the FSK demod is an integrated circuit phase locked loop. The Signetics 565 was used in this circuit. However, other PLL IC's such as the EXAR PLL chips, can be used with minor circuit changes. A PLL, shown in Figure 1, contains on one IC chip the following functional circuits: a voltage controlled oscillator which is adjusted to oscillate (free-running mode) close to the frequency of the incoming signal; a phase detector which receives the input signal and the VCO signal and provides a DC signal whose polarity and amplitude are proportional to whether the incoming signal is below or above the VCO signal; a DC amplifier which provides the demodulated output and a reference DC signal for the demodulated signal; and a low pass filter which limits the amount that the two signals (incoming and VCO) can be separated and still respond. More specific details on the PLL can be found in the referenced bulletin. However, the values of R and C_1 determine the VCO frequency as follows:

$$F_{vco} = \frac{1}{4\ R \times C_1}$$ where R is in ohms and C_1 is in farads

The bandwidth or range of frequencies which the PLL will operate over is given by the following expressions:

Lock Range - this is the range of frequencies in the vicinity of F_{vco}, once locked on the input signal, will remain locked on. The value of F_L, the lock range frequency is given by:

$$F_L = \pm \frac{8\ F_{vco}}{V_{cc}}$$ where V_{cc} is the power supply voltage, normally 5 to 5.5 volts.

Capture Range - This is the range of frequencies around F_{vco} over which the loop will acquire lock with an input signal initially starting out of lock. The value of the capture range, F_c, is given as follows:

$$F_c = \pm \frac{1}{2\pi} \sqrt{\frac{2\ F_L}{(3.6 \times 10^3) \times C_2}}$$ where $\pi = 3.1416$

The block diagram for the FSK TTY demod is given in Figure 2. A Signetics U741 operational amplifier is used to sense the mark space and from the frequency shifts detected by the 565 PLL chip. LED indicators are used to aid the operator in tuning the FSK signals to the proper values for input into the PLL. An SN7400 quad input NAND gate chip is used to shape the mark/space signals and provide for polarity changes (mark/space to space/mark) of the incoming TTY signals via the phase reversal switch. A print/mark switch allows the TTY to be placed in a stand-by condition during tuning adjustments. RFI suppression circuitry is shown by the diode across the TTY selector magnets and the resistor-capacitor across the switching transistor's collector.

Specific details on this demod are available from the author. He currently plans to send a complete description of the demod along with schematics, etc., to one of the ham journals for possible publication.

Reference: SIGNETICS Linear Integrated Circuits, Volume 1, dated 1972. Pages 209 to 213 give an excellent description of the 565 PLL and typical circuits.

(See Figure 1 and Figure 2 on Page 5)

(Continued from Page 4.)

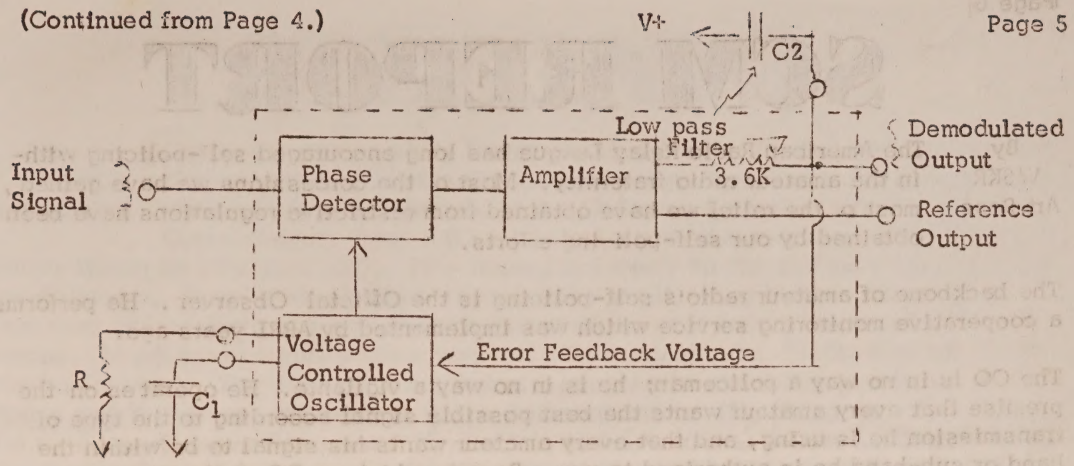

Figure 1 - Block Diagram of Signetics 565 Phase Locked Loop IC.

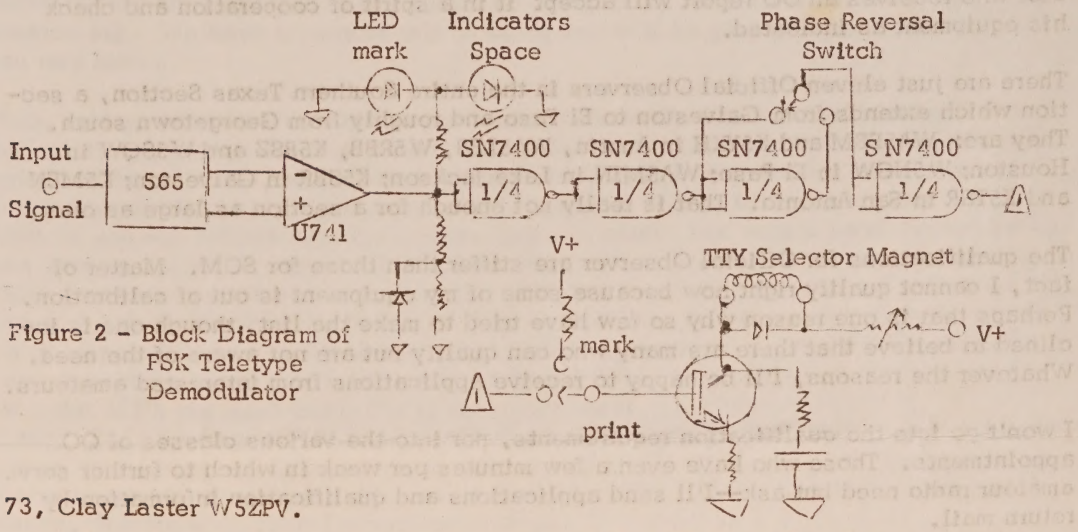

Figure 2 - Block Diagram of FSK Teletype Demodulator

73, Clay Laster W5ZPV.

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VHF-FM NEWS

By W5QMU Larry Higgings

San Antonio amateurs can look with pride at the recent and continuing performance of their colleagues in the Dayton-Xenia, Ohio area. According to earlier reports, the FM repeaters in the area of Greene and Montgomery Counties for some time provided important communications to the tornado-stricken areas. San Antonio VHF'ers can be proud that their repeaters are fully emergency power equipped (as they always have been), a prerequisite to usefulness in disasters.

It was pointed out, however, there was a dearth of mobile repeaters (Ham Radio News April 1974). Consideration should be given again in the local area to the construction and licensing of small portable repeater packages which can be carried to disaster areas.

Unfortunately, we run afoul the regulations. The Commission has taken no action to provide specifically for this type of operation (your repeater license does not provide for portable or mobile operation of the repeater). Furthermore, there is no provision for crossband operation which does away with the need for expensive tuned cavities.

Your state society is working very hard to keep the Commission aware of these and at least over a half-dozen other deficiencies in the regulations.

Every VHFM'er should join the state society. The dues are only $2.00 and may be forwarded to me or to W5PCX.

73, Larry W5QMU, Member, Board of Directors, Texas VHF-FM Society.

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FOR SALE: HT-44, AC PS, SX-117 - $250. Call Max Allen 655-4437.

SCM REPORT

By W5KR Art Ross

The American Radio Relay League has long encouraged self-policing within the amateur radio fraternity. Most of the concessions we have gained, most of the relief we have obtained from restrictive regulations have been obtained by our self-policing efforts.

The backbone of amateur radio's self-policing is the Official Observer. He performs a cooperative monitoring service which was implemented by ARRL years ago.

The OO is in no way a policeman; he is in no way a vigilante. He operates on the premise that every amateur wants the best possible signal according to the type of transmission he is using, and that every amateur wants his signal to be within the band or sub-band he is authorized to use. Reports which an OO mails to amateur radio operators is for their information and use. It is always hoped that each operator who receives an OO report will accept it in a spirit of cooperation and check his equipment as indicated.

There are just eleven Official Observers in the entire Southern Texas Section, a section which extends from Galveston to El Paso and roughly from Georgetown south. They are: WA5EEM and K5YXH in Austin, WA5LES, W5RBB, K5BSZ and W5SQW in Houston; W5NGW in El Paso; WA5MIN in Lake Jackson; K5SBR in Galveston; K5MEN and K5TSR in San Antonio. That is really not enough for a section as large as ours.

The qualifications for Official Observer are stiffer than those for SCM. Matter of fact, I cannot qualify right now because some of my equipment is out of calibration. Perhaps that is one reason why so few have tried to make the list, though one is inclined to believe that there are many who can qualify but are not aware of the need. Whatever the reasons, I'll be happy to receive applications from interested amateurs.

I won't go into the qualification requirements, nor into the various classes of OO appointments. Those who have even a few minutes per week in which to further serve amateur radio need but ask--I'll send applications and qualification information by return mail.

You say there are enough OO' in your city? Think of it this way: there are several amateur radio bands and there are twenty-four hours in each day. Can YOUR OO's cover all all of the bands every day? Are you sure your OO's don't need help? What about helping to cover the areas in time and in frequency which YOUR OO's cannot accomplish? Come on in, fellers. You'll like it-- IF you can qualify.

73, Art Ross, W5KR, Section Communication Manager, South Tx.

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SA DX CLUB

By W5LPO John Shean

A word to hams who are interested in DX operations. In past years, San Antonio area hams made names for themselves in international/national DX circles. We still have many of these gents in our midst such as Bob Carr W5UX, and Jim Rives W5JC and many others. These hams through their operating skill, devotion to the hobby, and untiring efforts did indeed set some very high scores and marks of excellence for us to consider in today's DX-ing. Today in DXing operations we find many SA area hams very active. Many of these are really considered as "Big-Guns" in national DX circles. Exponents of this group are Gene Jank W5EJT, who has achieved the highest award level of the ARRL DXCC honor roll; Bill Parry K5TSR, who really piles up high scores in DX tests; and, of course, Danny Weil VP2VB, who is a member of the exclusive CQ magazine "DX Hall of Fame", and many others.

The DX operating trend now is toward DX club oriented activities in larger cities. Much publicity is currently being given to these clubs in QST and CQ magazines, and in many world-wide DX publications--which constitutes excellent recognition to hard working DXers. These clubs operate multi-opr stations (e.g. W5SC) in more and more increasing numbers in DX tests, etc., which foster healthy competition among clubs and cities. Such contest operations by these clubs is also given wide publicity in DX circles. Probably the best feature of these DX clubs is their "strength-in-

(Continued on Page 7)

IEEE INFO

By W5AJU Hank Seibel

During the last week in March we attended the Institute of Electrical and Electronics Engineering Convention in New York City. All of the Company exhibits were housed in the Coliseum located at one corner of Grand Central Park, NYC. All the lecture sessions were conducted in Statler Hilton on 33rd St., NYC. Free busses ran every 20 minutes between the Hilton and Coliseum. There were 40 technical sessions in all, each lasting 3 hours. There were over 300 exhibits which represented most of the well known Electronics Corporations. Much to my surprise there was one 3 hour session on "Radio Amateur Space Communication". The session consisted of 5 papers with the following titles: (1) Modes and Techniques for Amateur Space Communication; (2) Using an Active Satallite for Space Science Education; (3) Results of Amsat-Oscar 6 Communication Satellite Experiments; (4) Design and Application of Physically Shortened Vertical Antennas; (5) The Stress Parabolic Reflector and Its Application to Space Communications. These papers are available to the public at a cost of $3.00 from IEEE, NYC. (Request Session #6). We have a copy of this session and will be glad to answer any questions you may have.

Well, really, what was new at the convention? I really didn't see any major breakthrough in any area. However, there were significant advances in such areas as automated testing of chips, better ways to unsolder chips, and a general downward trend in the cost of digital volt-ohm meters and counters. These test instruments run under $300.00 and are satisfactory for amateur use. A solder iron with a small hollow point was used to de-solder chips. The hollow point was connected to a small vacuum pump which removed the solder. A load spring chip remover kept a constant pressure on the chip and pulled it out as the last lead was de-soldered by the vacuum tip iron. A number of manufacturers displayed DC meters without pointers. The scales on the meter were conventional but reading is done by "Solid-State Ona/Led Indicator". A row of pin point LEDs are used under the meter figure scale to indicate the reading of the meter. The advantages of this type of meter are no inertia-producing mechanical parts and no over-sheet. A DC sensitivity of 1 uA full scale is claimed. A "Spage Age" Thermometer was displayed. Big, easy to read numbers show room temperature at a glance, disappear as room temperature changes (available at $10.95 each).

The pocket calculators (Slide Rule) attracted large crowds. I had purchased the H P-45 some time before going to the convention. I was happy to find that I still owned the most versatile calculator. While most of the calculators on exhibit were cheaper than the H P-45 none had all of the functions available on the H P calculator.

Just to make my stay in New York City and the convention a memorable one, a 2 to 3 inch snow storm was featured on Friday, the last day of the convention. For a while I was worried that I wouldn't get back home for the weekend. However, by Saturday morning most of the snow was cleared off the streets and I got to the airport and home on schedule. 73, Hank Seibel W5AJU.

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S A DX CLUB (Continued from Page 6)

numbers" capability to provide a strong "voice" for a group of DXers. Such a voice can be heard by ARRL and CQ magazine DX committees, etc., on matters of DX policy and planning.

In view of many advantages to the DX club concept, and a desire to get recognition for SA area DXers, Les Essington W5BE and John Shean W5LPO have decided to organize such a club. An organizational meeting is being planned at this time. Information will be submitted to The Bull-etin on the future activities of the club. Anyone interested in becoming a member or needing information--call Les 698 2215 or John 696 1879 anytime. 73, John Shean W5LPO.

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CHRISTMAS PARTY

SATURDAY, NOVEMBER 30.

ARDEN GROVE PARTY HOUSE

MARK THIS DATE ON YOUR CALENDAR -- PLAN NOW! !

NEWS AND VIEWS FROM THE ARRL DIRECTOR, WEST GULF DIVISION

"The Changing World of Amateur Radio"

Like many other activities in this world of ours, Amateur Radio in years gone by seems to have moved forward by a series of technical developments: The vacuum tube, voice communication, the superheterodyne, SSB, the transistor, and now the integrated circuit, each profoundly affecting us.

In step with these developments we amateurs, on our own, changed our interests and operating habits, mostly unimpeded by external forces. Rules and Regulations were something to be studied for the primary purpose of passing examinations for initial or advanced licenses, then soon forgotten, except for the major no - no's of clicks, profanity, AC hum, and out of band operation.

All this was suddenly changed during the latter years of the sixties with the advent of "pappa knows best" philosophy up on the Potomac.

And, now we hear: "If you think Incentive Licensing, the new Repeater rules, and limitation on message handling were catastrophic - you ain't heard nothing yet"!

If old Tom Paine were here he would say 'These are times that try men's souls'.

From this day forward, and with a degree of urgency and difficulty almost totally unknown to most of us, we now face the need to justify and defend our privilege in the frequency spectrum. It is time to sound the tocsin and man the barricades. This originally de facto right of occupancy has well been earned by the efforts of we and our predecessors. It is currently recognized by ITU and FCC. The problem facing this generation of radio amateurs is defense of that privilege, by innovation, conduct and coordinated action.

No longer can we blissfully ignore the new concept of a 'reason for being'. The guide-lines are clear, in five short sentences of FCC' Regulations Par. 97.1, sub. pars. a, b, c, d, and e. Read them, and weep, for the sword of Damocles hangs over our heads by the proverbial single hair.

This month, members of the ARRL Executive Committee meet in Washington with the staff of FCC's Amateur and Citizens Licensing Division. Here are <u>some</u> of the topics on the agenda for what might well prove to be a turning point in amateur radio:

a. The Commission's philosophy of regulation of the amateur service.
b. Information concerning restructering the amateur service.
c. Effectiveness of ARRL liaison with FCC.
d. Formation of the National Amateur Advisory Committee.
e. Preparation for the 1979 ITU Conference.
f. "Use it, or Lose it" philosophy for our VHF/UHF bands.
g. Net operations in the amateur bands.
h. RFI, TVI.

I'll be there, - with my fingers crossed!

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Both ARRL and FCC are taking a good hard look at Traffic Nets. This is the area where we have the best opportunity to perform a visible valuable public service. We currently have some 200 nets crowded into a most valuable portion of our frequency spectrum. Loud and long have been the cries for more frequencies for this purpose. Unfortunately the message receives a cold response because of the verbose and socializing nature of net operations instead of disciplined business-like functioning. Nets are urged to <u>completely</u> eliminate, by training, <u>all</u> unnecessary wordage, until all traffic is cleared. Then, if no other net is scheduled to use the frequency there could be no objection to socializing. Traffic handling, using proper procedure requires much training. Would we benefit from a one-day 'work shop' of all division net managers, for the purpose of coordinating our efforts in this important phase of amateur operations? Or, could it be accomplished by an on-the-air meeting?

73,

ROY L. ALBRIGHT, W5EYB, Director.